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A CASE OF GLAUCOMA FULMINANS OF PECULIAR INTEREST.

BY PETER D. KEYSER, M.D.,

Professor of Ophthalmology Medico-Chirurgical College, Philadelphia.

At the meeting of the American Medical Association, June, 1889, at Newport, R. I., I read a paper on Fulminating Glaucoma after Cataract Extraction with Iridectomy, giving three interesting and instructive cases. Since this time, having had a case of acute glaucoma of a similar character and a case as the first described cases but with such difference as to time and character of operation I think it well to be presented to the profession and therefore relate the following:

Mr. D. R. Young, æt. 64 years, of this city, came to me with cataract L. E.—R. E. divergent and amblyopic since childhood. The cataract had been gradually forming for about three years and at the time (Jan. 18, 1890) when I first saw him the lens was opaque. P. and P. perfect, and pupil fairly active under the action of light.

I made extraction of the cataract with large iridectomy upward, and all healed readily and well in a few weeks. After the third week the posterior capsule began to thicken and

eventually became quite opaque in the centre covering the pupillary region. This interfering with vision I determined to get it out of the way. With a fine Heyl's knife I attempted to lacerate it with the hopes that it would separate and thus give a clear hole, but it was so tough that the knife could not cut it. Then on March 26, eight weeks after the extraction, I drew the whole capsule out on a Tyrell's hook through a small opening in the cornea. The operation went off very well under cocaine, 2% solution, and he saw much clearer and more distinctly at once. Atropine had been instilled into the eye to dilate the pupil for the operation, and as an iridectomy had been previously made, and in the last operation the opening in the cornea was so small with no iris near it, no more atropia was used after the operation. The eye was well washed out before and after the operation with a x. gr. solution of boric acid, and a single Liebreich bandage put over it.

The eye was very quiet and easy until, toward morning, severe pain set in, and when I saw it the day after the operation there was a well marked case of glaucoma fulmunans. The tension of the ball was +3, a slight hæmorrhage in the anterior chamber, exquisit pain in the ball extending up through the temple into the head. The iris was pushed forward.

Vision still good but dimmed. Eserine salicylate, gr. ij.:℥j., was ordered instilled into the eye twice daily.

Applications of warm destillate of Hamamelis over the eye and morph. sulph. gr. $^1/_4$ doses to relieve pain. During March 28 and 29, there seemed to be but little relief except the absorption of the hæmorrhage, and I was thinking of making another iridectomy, but on the following day the eye was much better, and continued to improve until April 5, when severe pain again set in but no hæmorrhage took place. I then applied the artificial leech to his temple and gave him calomel gr. $^1/_4$ every hour. The artificial leech was applied again April 8 and the eye began to improve. Vision all this time kept good.

April 22, another slight attack of pain with light hæmorrhage in the anterior chamber. Artificial leech again applied.

Eserine instilled into the eye. From this time the eye went on to a healthy condition so that on June 5, with +10⌒+2 Cyl. 180° he has a vision of $^{6}/_{6}$.

This is another of those special cases of acute glaucoma that at times appear unexpectedly, and in eyes in which from their peculiar condition after a free or rather large iridectomy with extraction of the lens it would not in the least have been looked for, and in this case it appeared only after the extraction of the capsule two months after the cataract operation. I would say that the capsule was very readily drawn out without any stirring up of the vitreous. The whole operation was a very simple and easy one such as is frequently done in such cases.

CORRESPONDENCE.

AMERICAN OPHTHALMOLOGICAL MONOGRAPHS.

We publish the following letter, in the hope to help the worthy undertaking along.

CINCINNATI, O., June, 1890.

DEAR DOCTOR.—The undersigned will, if he meets with sufficient encouragement with the first number, undertake the publication of a series of monographs and essays upon ophthalmic subjects, to be entitled "American Ophthalmological Monographs." They will be issued at irregular intervals; at a price of one dollar a number, payable after delivery of each number.

The design is to furnish a medium through which can be published works of merit that at present have little or no chance of ever seeing the light. We refer to a class of works, so many examples of which appear in Germany and France: Essays that are so long, or so expensively illustrated that the journals can not afford the expense or space for them, and no publisher here will face the almost inevitable loss that meets their issuance in pamphlet or book form. For example, the Monograph on hand ready to issue as the first number will make seventy to eighty pages, with some ten or twelve colored and lithographic plates. No matter how great the merit of such an Essay, no publisher will touch it in this country.

Again, as such material is usually the work of the younger men of limited means (for those with large practices generally can not find the time necessary for original and laborious work of this character) their publication can not, as a rule, be as-

sumed by the authors on the score of the great attendant expense.

If, however, a method of co-operation be utilized, the difficulties can be easily avoided. With a list of subscribers assured; and some pages of selected advertising utilized, the expense can be guaranteed. We hope you will think enough of this movement to at least make the trial of getting out one number. If so, sign the enclosed blank and return it to

Yours very sincerely, DAVID DEBECK, M.D.,
Ass't to Chair of Ophthalmology, Medical College of Ohio,
Cincinnati, Ohio.

AFFECTIONS OF THE CORNEA FOLLOWING ADMINISTRATION OF THE BROMIDES.

OMAHA, NEB., July 27, 1890.

EDITOR AMERICAN JOURNAL OF OPHTHALMOLOGY.—Allow me to inquire through the pages of your journal whether any of its readers have seen affections of the cornea follow the prolonged administration of the bromides. The inquiry is prompted by the following case: H. T., æt. 15 years, unusually strongly-built boy, five years ago fell, striking the back of his head violently. After this he began having typical epileptic convulsions. These were controlled by bromide of potassium, the dose running sometimes as high as 70 grs. a day, but most of the time 40 grs. a day was given. In the spring of 1889, while taking 40 grs. daily, L. E. developed a keratitis which I first saw several weeks after it commenced in the form of a sharply circumcribed central corneal infiltration about 5 mm. in diameter; epithelium over this stippled but no loss of substance; no history of traumatism. Under heat, quinine and yellow ointment, this infiltration did not clear up but remained as a permanent opacity. The bromide was stopped during the course of the affection, but as the convulsions returned it was again resorted to in the same doses as formerly. This June while on 40 grs. daily, R. E. became affected without

traceable cause; seen by me about 3 days after. Examination showed very fine linear branching losses of corneal epithelium, beginning at upper outer limbus, one line reaching centre of cornea. Around the end of this line there developed an interstitial infiltration which in spite of heat, quinine, cod-liver oil, and Fowler's solution bids fair to leave a central opacity similar to that in the left eye, though not nearly so large nor dense.

Now while the bromide may have nothing to do with the trouble, the possibility cannot be denied, and the boy's father, one of the leading physicians here, is in the unfortunate position of wanting to give bromides to control the epilepsy, yet fearing to do so lest the eye-sight be further injured. Any experience bearing on the case would be gratefully received by him and the writer.

H. GIFFORD,
1404 Farnam St. Omaha, Neb.

SOCIETY PROCEEDINGS.

AMERICAN OPHTHALMOLOGICAL SOCIETY.

Twenty-sixth annual meeting held at Hotel Katerskill, Catskill Mountains, July 16 and 17, 1890.

Wednesday Morning.

The society was called to order by the president, Dr. Hasket Derby, of Boston.

The first paper was that of Dr. W. F. Norris, of Philadelphia, reporting two cases of

Brain Tumor with Interesting Eye-Symptoms.

Case I.—Mrs. X., æt. 32 years, a strong vigorous woman, was seen in June, 1889. During last few months there had been failing eyesight. No double vision. Movements of lid and ocular muscles good. Right pupil responded promptly to light. The left was slower in its response, and was larger than the right. The ophthalmoscope showed a low grade of hypermetropia and hypermetropic astigmatism. Discs normal. The field of vision in left eye was defective in upper outer quadrant. In the right eye the defect was in the upper and inner quadrant, but not so marked.

April 4 she had a slight convulsion. She began to have pain referred to the right side of the head and eye. May 6, right optic disc began to be hazy and slightly prominent. Left disc also swollen. Both pupils sluggish. Twitching of muscles of shoulder. Increased headache. Nausea without vom-

iting. Diplopia was first noted May 18. She was seen by Drs. Wm. Osler and S. Weir Mitchell in consultation, and diagnosis of a tumor of the base, probably near the optic thalmus, was made. June 3, there was a convulsion, followed by nystagmus. Death occurred July 5. The diagnosis was confirmed by the autopsy. Microscopical examination showed the characteristic appearance of glioma.

CASE II.—Mrs. Y. was seen in January, 1889. She had lost the sight of one eye, and was rapidly losing that of the other. A year previously she was seized with deafness in the right ear, six months later she had an attack of severe pain in the right trigeminus. Later there was double vision and gradual failure of sight. The right eye was slightly prominent, the pupil semi-dilated and irresponsive to light. There was paralysis of the external rectus muscle. There was in the right eye a dense grayish haze of the retina, most marked about the nerve. The disc was slightly in advance of the retinal level. In the left eye vision was diminished and there was a semi-transparent haze in front of the disk. There was loss of smell in the right side of the nose, and the skin and mucous membrane on this side was less resistent than on the other. There was absolute deafness on the right side. Six days after this observation vision in the left eye was entirely lost. The patient then returned to her home. There was increased suffering from headache and intense neuralgia in the superior and inferior dental nerves, especially on the right side. A few days before death the right eye became so prominent that the lids could not close over it. June 10, the patient became comatose and died.

The autopsy showed a large firm tumor occupying the sella turcica, extending on each side along the wings of the sphenoid, especially on the right side, and also toward the base of the skull. The growth was a carcinoma and involved the second, third, fourth, fifth, sixth, seventh and eighth nerves on the right side, and the second and third on the left side.

Dr. Charles A. Oliver, Philadelphia, gave the history of a case of

Intracranial Neoplasm with Localizing Eye Symptoms; Position of Tumor Verified at Autopsy.

The patient, a male adult, presented general symptoms of right hemiplegia and right hemianæsthesia. When first seen by the writer there was right lateral homonymous hemianopsia, the left field of vision being smaller, with well marked Wernicke hemiopic pupillary reaction sign. In the remaining field there were floating,scotomata for green, more pronounced on the left side, with slight subnormal color perception, also more marked in left field. In the right fundus there was a broad, superficial blotch-like hæmorrhage, extending over the lower outer quadrant of the disc, with enlargement and tortuosity of both the retinal veins and the arteries of the same side.

This grouping of symptoms led to a diagnosis of a gross intra-cranial lesion near or in the left optic thalmus. Autopsy four weeks later showed a glio-sarcoma involving the external portion of the left optic thalamus, as well as the corpus striatum, almost as far as its anterior third. The left optic tract, as far forward as the optic chiasm, was markedly flattened and pressed upon.

Dr. G. C. Harlan, Philadelphia, read a paper on

Transient Amblyopia with Bi-Temporal Hemianopsia in a Case of Malarial Cachexia.

A sailor, æt. 22 years, was admitted to the hospital September 2, 1889, with severe chills and fever. During the following month he exhibited varied nervous symptoms, headache, mania, hallucinations, etc. Quinine was given without any effect, with the exception of preventing a recurrence of the chills.

November 14, there was diminution of sight, and the patient could see only in front. Vision existed only in the nasal fields. November 18, patient was entirely blind. The next day there was some return of vision. Microscopic examina-

tion showed pigmented corpuscles in great number. Quinine, 24 grains daily, caused rapid improvement. Vision rapidly returned, and on the 24th was normal. By the 30th, the pigmented corpuscles had disappeared. There was no return of the symptoms.

Dr. C. S. Bull, New York, read a paper on

The Extraction of Dislocated Lenses From the Eye, Whether Transparent or Cataractous.

The author maintained that in the majority of cases it was possible to extract a lens, dislocated into the vitreous, by external manipulation, without the introduction of any instrument into the eye. The manipulation may be described as follows: The lids are held open by a wire speculum, and the section made upward with a narrow knife. The speculum is then removed, and the upper lid lifted away from the ball with a wire elevator. Pressure is then made against the lower part of the eye-ball, the pressure being made directly backward; the lens will be seen to rise and appear at the pupil. Sometimes it comes through the pupil, but occasionally the use of a blunt hook or wire spoon becomes necessary. If continued pressure fails to push the lens through the pupil or occasions prolapse of the vitreous, some other method must be substituted. For a number of years he had not found it necessary to introduce a spoon into the vitreous chamber to remove a dislocated lens floating in the vitreous.

Dr. C. S. Bull presented some further considerations on the

Simple Operation for the Extraction of Cataract.

The paper was based upon some 160 cases of cataract extraction without iridectomy. The method of operation and the complications liable to arise were discussed in detail. The advantages claimed were: (1) If successful without complication, the natural appearance of the eye is preserved. (2) The acuteness of vision is greater than with the older operation.

(3) Eccentric vision is decidedly better. (4) Small particles of the capsule are less likely to be incarcerated in the wound. (5) It is a shorter operation in point of time. (6) As there is no iridectomy, there is little or no hæmorrhage.

The disadvantages are that the technique is more difficult than that of the old operation, the corneal section must be larger; the section must be performed rapidly and there is danger of the iris falling upon the knife; the cleansing of the pupillary space and posterior chamber is more difficult; posterior synechia and incarceration and prolapse of iris is more common. The operation is not applicable to all cases.

Dr. Hasket Derby, of Boston, reported

Eight Cases of Double Zonular Cataract Among Ten Members of the Same Family.

Removal of a Large Exostosis of the Orbit with Preservation of the Eye.

By Dr. T. R. Pooley, New York.

The patient was an Irish girl, æt. 23 years, who came under observation Aug. 21, 1888. Two years before she had noticed protrusion of the right eye-ball. At the upper inner angle of the orbit a hard tumor could be felt. A diagnosis of orbital exostosis was made and confirmed by exploratory incision. The patient then dissappeared until Feb. 6, 1890, when she returned with pronounced optic neuritis. V.=$^{20}/_{cc}$. Next day there was great pain in and about the orbit with rise of temperature and mild delirium. Exophthalmus was increased and immediate operation urged. The tumor was then removed by the use of the chisel, the mallet not being required. The bony growth measured 39x28x30 mm. and weighed 26 grammes. The patient was discharged at the end of 3 weeks and vision gradually increased to $^{20}/_{XL}$ and all evidence of neuritis disappeared.

Operation for Ectropion of the Lower Lid by the Sliding Flap Method.

By Dr. T. R. Pooley, New York.

The object of the communication was to show the adaptability of this operation to the relief of cicatrical contraction. The patient was a woman suffering with ectropion resulting from cicatrical contraction following the removal of epithelioma of the lower lid. The conjunctiva to the cul-de-sac was exposed; a flap was slid from the temporal region to fill the gap in the lower lid. The patient was discharged ten weeks later with a perfect result.

Case of a Foreign Body Remaining in the Eye About Twenty Years, Followed by Abscess in the Scleral Wall, Opened and Recovery.

By Dr. B. L. Millikin, Cleneland, O.

On March 18, 1871, E. M. O., æt. 10 years, was struck in the right eye by a bit of musket-cap, which he supposed at the time did not enter the eye. Following the injury the eye was greatly inflamed, confining him to his room nearly three months. The eye gave no further trouble and vision was fair until 1883, when he had an attack of severe inflammation in it. The eye again improved with fair vision, and remained well until 1887, when it again became red and painful with failure of sight.

The patient was seen for the first time Feb. 28, 1888. Three or four days before, another attack of inflammation had occurred. The cornea showed a linear opacity. Behind this was a slit in the iris. The ophthalmoscope showed an oblique tract directly through the body of the lens. In the anterior portion of the vitreous was plainly seen a grayish-white body projecting into the vitreous; this had the appearance of an en-

cysted body. Vision in right eye $=^{6}/_{xxxvi}$, in left eye $^{6}/_{vi}$. There was tenderness on pressure over the position of the body.

September, 1889, he had another severe inflammatory attack, but was not seen until November 27. Under active treatment the inflammation subsided.

In December an enlargement appeared over the position of the enlarged body and rapidly increased in size. January 14, the eye-ball was free from any general inflammation, but the projection over the foreign body had increased in size. Under cocaine a needle was passed through the swelling and came in contact with a hard body. A triangular portion of the conjunctiva was then dissected off and an incision made into the swelling. Three or four drops of pus escaped. With a spoon a number of hard, black particles were scraped out. As much as possible of the interior of the sac was removed with the spoon, forceps and scissors. The sclera was at least a centimetre thick at this point. The eye recovered without a bad symptom; the body previously seen in the vitreous chamber had disappeared. By January 22, V.$=^{3}/_{xxx}$. Since the operation there has been no return of the inflammatory attack.

Foreign Body in the Orbit.

By Dr. W. F. Norris, Philadelphia.

Case 1. T. R. came under observation on account of pain in the left forehead and orbit. The eye-ball of that side was wanting. The orbit was filled with a mass sensitive to the touch and at the bottom of the cavity was an opening discharging pus. The probe detected a hard body. He had been struck 18 months before by an exploding railroad torpedo, shattering the left eye, which was enucleated by a surgeon, but the orbit had never healed. The patient was etherized and a large piece of metal which had formed the shell of the torpedo was removed by forceps.

Case 2. P. B., æt. 47 years, was struck in the eye by a piece of nail which flew from a piece of wood he was sawing

with a circular saw. Some days after the accident he came to the hospital. There was an opening through the lower lid and the sclerotic conjunctiva. A minute black point was seen projecting from the eye which was found to be metallic, and on removal it proved to be a nail $^{3}/_{4}$ of an inch in length.

Complete Paralysis of the Lateral Movements of Both Eyes, Ability to Converge, Remaining Intact.

By Dr. B. L. Millikin, Cleveland, O.

M. M'L., æt. 33 years, Irish, laborer, presented himself March 21, 1890. Twelve years ago first noticed that he saw things double, but this passed off in a short time. For the past few weeks had been much annoyed by the double images. The patient has been addicted to the excessive use of alcohol, but denies syphilis. In each eye V.=$^{6}/_{IX}$. When winking the left eye does not close as rapidly as the right. The eyes follow an object carried up and down in front of them, but in no position of the field can the eyes be seen to move laterally. When the eyes fix an object and this is carried towards the eyes, they are seen to converge so that the object may be carried to within 7 or eight inches of the eyes; pupillary reaction is normal. Each optic disc was small, round, with a narrow choroidal ring, slightly deepened pearly color, and slight degree of H. There were no nervous symptoms and no history of previous illness. Ten grs. of iodide of potassium 3 times daily was ordered, but only a few doses taken. By April 4 the lateral movement of the right eye seemed normal and that of the left eye was improving. The patient then passed from observation.

Dr. Charles E. Rider read a paper on

The Winking Test.

The object of the paper was to point out the relation that exists between the ability to close one eye independently of the other, and the acuteness of vision. The attention of the

writer was directed to this relation by the fact, which he had frequently noted, that such persons as surveyors, sportsmen, and others who use one eye for sighting objects, as a rule, close the poorer eye. Noting this, he was led to make a study of a series of cases, numbering 300. The results obtained were as follows. The term isopia was suggested to indicate those having equal vision in the two eyes, and anisopia to indicate those having unequal vision.

300 cases.			Male.	Female.
Cannot wink,			1	30
Isopia	Wink equal,		30	33
	Wink unequal,		4	27
Anisopia	Wink equal,		17	12
	Wink	Better eye,	4	12
		Poorer eye,	64	66
			120	180

Of anisopic males who wink unequally, 94 wink the poorer eye, and of females 84 wink the poorer eye.

The practical applications of this test were referred to, and its availability in certain medico-legal cases mentioned.

Dr. J. N. Lippincott, of Pittsburg, read a paper on

New Tests for Binocular Vision.

The tests suggested are the outcome of some observations and experiments, the result of which were published in *Knapp's Archives* for March, 1889, under the title of "Binocular Metamorphosia Produced by Correcting Glasses." In practice, a convex cylindrical lens of 2 or 2.5 dioptres, axis vertical, is held before one eye, and the patient is asked which side of a card, ten or twelve inches square, held at the reading distance, appears the higher. The question is repeated with the axis of the cylinder horizontal. Then a concave cylinder is substituted for the convex cylinder, etc. The principal advantages which may be claimed for these tests, which are, in fact, steroscopic tests without a steroscope, is their variety and

simplicity, and, moreover, the patient can be more closely watched when under observation, than if his eyes are hid behind the pieces of the stereoscope.

Dr. B. Alexander Randall read a paper on

Can Hypermetropia be Healthfully Outgrown?

The writer claimed that the investigations showing the predominance of hypermetropia and the rarity of emmetropia had not been properly accepted. The assumption of the prevalence of emmetropia has little basis, and the claim that the hypermetropia which preponderates in infancy is really less in childhood, and has passed away at maturity, is in conflict with the best attested facts. Even the decrease of the grade of defect from infancy onward is slight, if indeed actual. He cited the results of all the investigations, giving data as to the relation of age to refraction. These showed a very slight decrease in the grade of hypermetropia, a decrease which is really surprisingly small in view of the large amount of pathological tendency towards myopia which has been observed. The author therefore held that all tendency toward emmetropia and myopia was pathological, not physiological.

Dr. Henry D. Noyes, New York, read a paper on

Treatment of Muscular Asthenopia, and Its Results.

The paper was a statistical one from which certain deductions were drawn. It was based upon a study of 100 consecutive cases of muscular asthenopia, in which prisms were employed. The cases had all been under observation sufficiently long to render the results worthy of study. Coexisting errors of refraction were found in certain cases but the influence of such errors in the causation of the symptoms was excluded. Among the cases reported there were 60 males and 40 females. The occupation of three-fourths of the cases was such as to demand persistent eye strain. The majority of the patients were in good health, less than 40% being in a feeble condition.

The symptoms noted were ocular and general. Among the former were pain, blurring and unsteadiness of print, inability to look at moving objects, inability to look fixedly at any object, difficulty from seeing the nose, photopsia, unsteadiness of the globe, spasm of the accomadation, and conjunctivitis. Among the general symptoms found were headache which often presented the singular feature of occurring on first waking and increasing during the day, vertigo, nausea, insommia, melancholia, pain in remote parts, tenderness over the orbital nerve and nasal catarrh.

A study of refraction showed emmetropia in 47, hypermetropia in 25, myopia in none, astigmatism 27, hypermetropic astigmatism 21, myopic astigmatism 4, mixed astigmatism 2, and anisometropia 1.

The muscles affected were as follows: Weakness of the externi, 92; weakness of the interni, 4; general weakness of all the muscles, 1. In five cases there was in addition a vertical error. It is to be observed that the proportion of cases of weakness of the externi is not so great as would seem from this report. The proportion as probably about 75%.

In the treatment of these cases attention was first paid to the indications presented by the condition of the general health. Many patients had been subjected to general and local treatment without relief. In some cases the use of prisms was at first tentative. In more than half the cases headache was a prominent sympton. It was in most instances relieved by the use of prisms, in some it was lessened and in a few it was not benefited at all. In the larger number of cases, prisms were worn constantly. The final results were, complete relief in 74 cases, moderate relief in 5, no relief in 13, temporary relief in 6.

THE REPORT OF THE COMMITTEE ON BLINDNESS.

was then called for and read by the Chairman, Dr. Lucien Howe of Buffalo.

The study made by the committee showed that about 20%,

of the cases of blindness were due to ophthalmia neonatorum and purulent ophthalmia and suggested certain means of prevention in the way of legal enactments.

Dr. L. Howe also read a paper on

Legislation for the Prevention of Blindness.

As nearly one-fifth of all the blind in the various asylums are there because of ophthalmia neonatorum and as nearly all these cases could be cured if seen in the very first stages of the disease, therefore the writer urged the necessity of requiring nurses to report promptly every such case to some proper medical officer. In other countries stringent regulations have been adopted in this respect concerning the duty of midwives and it was deemed in every way desirable to obtain as far as possible here also the enactment of laws similar to that recently passed by the legislature of New York. This is as follows:

Sec. 1. Should any midwife or nurse having charge of an infant in this State notice that one or both eyes of such infant are inflamed or reddened at any time within two weeks after its birth, it shall be the duty of such midwife or nurse so having charge of such infant to report the fact in writing within six hours to the health officer or some legally qualified practitioner of medicine of the city, town or district in which the parents of the infant reside.

Section II. Any failure to comply with the provisions of this act shall be punishable by a fine not to exceed $100.00, or imprisonment not to exceed six months or both.

Section III. This act shall take effect on the first of September, 1890.

Dr. J. A. Andrews of New York, read a paper entitled

Purulent Ophthalmia.

It has been claimed that the gonococcus was the cause of gonorrhœa and that purulent ophthalmia was due to the same

cause. The writer has made a number of examinations to see if the gonococcus were always present in these two affections, he had found the gonococcus in all cases of acute urethral gonorrhœa. In 144 cases of chronic urethral gonorrhœa, he had found it in 108 cases. In the purulent ophthalmia of adults, the gonococcus was found in all cases. In the purulent ophthalmia of infants between the ages of two and three months it was found in 3 cases out of 9 examined. This makes 364 cases examined with the discovery of the gonococcus in 322. In nearly all cases the staphylococcus pyogenes aureus was also present.

In the treatment of purulent ophthalmia the uninterrupted application of cold, washing with a saturated solution of boric acid and the use of a solution of nitrate of silver not exceeding 2% was urged. The solution of silver is to be applied once or oftener during the day according to the indications. If the discharge is not profuse, once a day is sufficient. If the discharge and swelling increase, the application may be made more frequently. Nitrate of silver is not well borne when there is little inflammation. The writer has found experimentally that a 2% solntion of nitrate of silver destroyed the infective properties of the pus in from six to ten seconds.

Dr. Andrews also exhibited a drawing of

Cystlike Bodies of the Conjunctiva.

These occurred in a child five years of age, whose mother and brother had trachiomia. The child itself had no affection of the cornea or trouble with the eye. The microscope showed that they consisted of unpertropied conjuncsival tissue.

Chas. W. Kollock, Charleston, read a paper entitled

A Form of Xerosis.

The author described a form of disease commonly seen among weak scrofulous colored children which differed from xerosis as commonly seen in that the conjunctiva is never con-

tracted, the cornea although more or less affected is never destroyed and under proper treatment recovery takes place.

Dr. Kollock also reported

Two Cases of Glaucoma, Presenting Certain Interesting Features.

In one case, æt. 50 years, iridectomy was performed, but the operation was followed by increased tension lasting two days A four grain solution of eserine was then instilled every half hour. Under this the tension rapidly fell to normal.

Dr. W. F. Mittendorf, of New York, reported a case of

Embolism of the Upper Branch of the Retinal Artery with Normal Vision.

In which, owing to the peculiar anatomical arrangement the macula lutea was supplied by the lower branch of the retinal artery. In the lower part of the field vision was absent, but in the remaining parts of the field it was normal. The treatment consisted of pressure, massage and digitalis. Vision is now returning in the lower portion of the field.

A Case of Recurrent Irido-Choroido-Retinitis.

By Dr. Samuel Theobald, Baltimore.

Ida R., æt. 25 years, was seen July 8, 1889. Her general condition was fairly good. There was no evidence of congenital or acquired syphilis. She was suffering from recurrent attacks of inflammation in the left eye, which she said had begun two years before and had destroyed the sight of that eye six weeks before coming to the hospital. The eye had evidently been the seat of severe irido-choroido-retinitis. The right eye showed no signs of disease. Enucleation of the left eye was strongly urged. This was declined. She was put on small doses of iodide of potassium with instillation of atropin to the affected eye. Dec. 6 she again came to the hospital,

having had an attack of inflammation in the right eye three weeks before. The eye was somewhat improved V.=$^{15}/_{LXX}$. The left eye was at once enucleated and atropin applied to the right eye. The next day the ophthalmoscope showed that in the right eye there had been a mild attack of iritis and slight inflammatory changes could be seen in the retina. Iodide of potassium and biniodide of mercury were ordered and the eye slowly improved. Dec. 23, V.=$^{15}/_{L}$. Jan. 3, 1890, another attack of inflammation suddenly appeared without cause, V.=$^{7}/_{CC}$. The iodide was increased to five grains every three hours and a large blister applied to the nape of the neck. Jan. 8, vision had improved to $^{15}/_{CC}$, but there was evidence of commencing iritis. The iodide was now substituted by hydrarg. biniodide gr. $^{1}/_{16}$ three times a day and application of atropia to the eye. The eye steadily improved and by Jan. 28 V.=$^{15}/_{XLV}$. Feb. 11, the inflammation recurred. By March 10 this attack had been recovered from. Another relapse occurred March 28. As the attacks seemed to recur with a certain degree of regularity, quinia was tried. Under this there was improvement. May 28 there was a most severe attack. June 13, tension for the first time was found about normal; the condition of the eye steadily grew worse, and June 24 iridectomy was decided upon as a last resort. It was found impossible to grasp the iris with forceps, and as a result the intended iridectomy was converted into a simple sclerotomy. The effect of the operation was most satisfactory. July 7 she left hospital suffering no pain, but the vitreous was as cloudy as before, and it was impossible to determine that there was even light perception.

Syphilis could be almost certainly excluded in this case. The most probable explanation is that the inflammation was through the medium of the sympathetic or trophic nerves and was dependent upon pathological changes in the ganglionic changes which have to do with the nutrition of the eye.

A Contribution to Ocular Tumors.

By Dr. W. H. Carmalt, New Haven.

Four cases of ocular tumors were reported, two of sarcoma of the conjunctiva and two of glioma. One of the latter was a case of double glioma in an infant, æt. $1^1/_2$ years. Both eyes were enucleated and so far there has been no return, a period of one year.

In the second case the condition was not diagnosed, as the lens was cataractous and nothing could be seen. Later on there was great pain and the eye became disorganized and was removed. A year later the child again appeared with the orbit filled with a neoplasm. The condition was then recognized, the growth was thoroughly removed and the parts cauterized with chloride of zinc. Five months later, just as healing was about completed, indications of cerebral trouble appeared, and in about ten days the child died. At the autopsy a tumor was found occupying the anterior portion of the brain; a second growth was found in the cerebellum on the right side.

Dr. R. J. McKay, Wilmington, Del., reported

A Case of Orbital Cellulitis.

Progressive Astigmatism,

By Dr. Edward Jackson, Philadelphia.

The author reported seventeen cases in which the increase of astigmatism in hyperopic eyes had made needful a change of the correcting lenses. Such an increase seems to occur in about two per-cent of all cases. It may be due to chronic congestion of the eye from eye strain, resembling progressive myopia, or to a congenital tendency of the eye to develop thus asymmetrically. The latter mode of origin was pointed to by the blood relationship of several similar cases. Bearing these cases in mind, the surgeon could not promise that the astigmatism of an eye would remain constant, or assume that

a colleague had been mistaken simply because lenses previously ordered by him did not suit the case.

Three Noteworthy Cases of Ametropia.

By Dr. Samuel Theobald, Baltimore.

The noteworthy feature in these three cases was the existence in each of so much better near vision than the age and refractive condition of the patient appeared to warrant. In two of them (cases 1 and 3) it seemed as though the lids were used (as they can be by narrowing the palpebral aperture and altering the corneal curve) to render the retinal images more distinct. In one case (case 2) it was noted that the pupils were exceedingly small. In case 3 it is noted that the pupils were not unusually small.

The detailed histories of the three cases were then given:

Case 1.—Male, æt. 50 years, suffering with asthenopia, headache, etc. Had never worn glasses for distant vision, but for near vision he used $+^{1}/_{30}$s. With this he read Jouger 1 at 8 inches. The ciliary muscle was active. It was found that in the right eye there was H.$^{1}/_{9}$ and in the left H.$^{1}/_{9}$ with As.$^{1}/_{72}$. With this corrective vision which without glasses was only $^{20}/_{c}$(?) was brought up to $^{20}/_{xx}$.

Case 2.—Dr. T., æt. 59 years, suffered with asthenopia and hyperæmia of lids and conjunctiva. The pupils were exceptionally small. For near vision he used $+^{1}/_{18}$s, reading J. No. 1 with the left eye and J. No. 2 with right eye. He was found to have in the right eye H.$^{1}/_{16}$ (V.$=^{20}/_{xx}+$) and in the left eye H.$^{1}/_{20}$ (V.$=^{20}/_{xxx}$). For near vision the best results were obtained with $+^{1}/_{9}$s for right eye and $+^{1}/_{10}$s for left eye.

Case 3.—Mrs. R., æt. 54 years, never wore glasses, but had been able to read the small type of a newspaper. Her manifest error of refraction as corrected was R.E.+6.D. cyl. ax. 70°. L.E.+4.25D. cyl. ax. 110° and in near vision the addi- of 1.50D. spher. to these cylinders gave the most satisfactory effect.

An Analysis of the Ocular Symptoms Found in the Third Stage of General Paralysis of the Insane.

Dr. Charles A. Oliver, of Philadelphia, read a paper on this subject.

In an analysis of some of the ocular symptoms in this disease, the author after making thirty-three special observations of the motor, sensory and purely local conditions, arrives at the following summary and conclusions:

1. The oculo-motor symptoms of the third stage of general paralysis of the insane, which consist in varying though marked degrees of loss and enfeeblementof response to light-stimulus, accomodative effort and converging power: lessening of ciliary muscle tone and action, weakening and insufficiency of the extra-ocular muscle motion, all show paretic and paralytic disturbances connected with the oculo-motor apparatus itself. All of greater amount and of more serious consequences than those seen in the same apparatus during the second stage of the disease.

2. The sensory changes of the third stage of general paralysis of the insane which though similar to those found in the second stage of the disorder are so pronounced as to show a semi-atrophic condition of the optic nerve head and a marked reduction in amount of both nerve and retintal circulations with consequent livening of centric and eccentric vision for both form and color. All indicate a degenerate condition of the censory position of the ocular apparatus with impairment of sensory nerve action.

3 The peculiar local changes seen in these cases, which consist in conditions of the choroid and retina indicative of more pronounced local disturbances and irritation of these tunics than those found in the second stage of the disease, all represent the result of greater wear and tear given to a more delicate and more greatly weakened organ.

4. Both the motor symptoms and the sensory changes as thus described in the advanced or third stage of general paralysis of the insane furnish not only evidence of local disturbance

of a more pronounced type than those found in the second stage of the disorder, but plainly show themselves as some of the many peripheral expressions of fast approaching degeneration and dissolution of nerve elements; most probably connected with related cortex disintegration and death.

Dr. John Green of St. Louis read a paper entitled

AN ELEMENTARY DISCUSSION OF SOME CASES OF TIPPED SPECTACLE GLASSES.

A NEW OPERATION FOR SYMBLEPHARON

was described by Dr. George C. Harlan, Philadelphia.

In this case the lower portion of the lid was adherent to the eye ball as the result of the inflammation following an injury from molten metal. The lid was first dissected from the eye ball and the skin cut through except at the attachment at each end. A flap of skin of sufficieut size was then dissected below and turned up so that the fresh surface was applied to the lid and the skin surface took the place of the conjunctiva. The result had been very satisfactory.

Dr. S.D. Risley and B. Alex. Randall, of Philadelphia, read a paper entitled

CYST OF THE IRIS FOLLOWING A PENETRATING WOUND AT THE CORNEAL MARGIN WHICH CAUSED SYMPATHETIC NEURO-RETINITIS.

A boy, æt. 10 years, was struck on Dec. 12, 1882, by an air gun dart in the left eye which penetrated to the lens and its withdrawal was followed by prolapse of the iris. This being irreducible was drawn out and excised and healing resulted with a slightly cystoid scar. The right eye had been weak and watering and on Jan. 22 showed distinct neuro-retinitis and the vision quickly fell from $^{20}/_{XXV}$ to $^{20}/_{XL}$. Under alteratives and atropine he improved until with +2 vision equalled $^{20}/_{XXX}+$ on March 17 and $^{20}/_{XX}$ on April 18. Two months later there was a sudden attack of blindness with an eptileptoid seizure. A year later vision with the right eye was $^{20}/_{XX}$ and with the left fingers at two feet. In March, 1890, he re-

turned with the left eye red and watery and with a cyst of the lower part of the iris. Vision nil, tension slightly diminished. Enucleation was advised. After a delay of two months, during which time the cyst increased in size and vision declined in the right, the eye was enucleated. The microscopic examination has not yet been completed, but there is no sarcoma in the vitreous chamber.

Dr. O. F. Wadsworth, Boston, read a paper entitled

THROMBOSIS OF THE ARTERIA CENTRALIS; CENTRAL VISION UNAFFECTED.

A young woman, æt. 24 years, had diminution of vision in the left eye. The field was much contracted but central vision was unaffected. Examination showed plugging of the central artery. The circulation on the macular region was however maintained by an anomalous vessel, a retino-ciliary artery.

Dr F. M. Wilson, of Bridgeport, Conn., presented three specimens of filaria oculi humani.

Dr. George C. Harlan reported a case of temporary pulsation of the retinal arteries following the application of homatropine.

Dr. Harlan also exhibited a modification of the Noyes ophthalmoscope.

Dr. B. Alex. Randall moved that the society express its approval of the method of nomenclature of prisms suggested by Dr. R. S. Bennett. This was adopted. The following officers were elected: President, Dr. Hasket Derby, New York; Vice-President, Dr. G. C. Harlan, Philadelphia; Secretary and Treasurer, Dr. S. B. St. John, Hartford, Conn.; Corresponding Secretary, Dr. J. S. Prout, Brooklyn.

The following were elected to membership: Drs. A. E. Ewing, St. Louis, Mo.; Neil J. Repburn, New York; Chas. M. Culver, Albany, N. Y.; Richmond Lenox, Brooklyn; Frank B. Ringe; New York.

The Society then adjourned to meet with the Congress of American Physicians and Surgeons, September, 1891.

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

Regular meeting, Thursday, May 1, 1890, J. Hughlings Jackson, M.D., F.R.S., President, in the Chair.

Corneal Tumor (Fibroma?) in a man, æt. 72 years. Dr. Benson (Dublin) read notes of this case. The tumor was attached to the upper portion of the left cornea of a blind glaucomatous eye. It measured 5 millimetres in its longest diameter, 2 millimetres in thickness. It was adherent to the surface of the cornea above the centre by 2 or 3 millimetres of its thin edge. The eye was said to have been blind for many years, but a few days before the patient came under observation he had knocked it against something, and since the blow had suffered intense pain. There was no evidence of recent injury to the eye. The growth was dissected off the cornea, and was found to consist of fibrous tissue with bloodvessels and cells, the whole being covered with epithelium, except at the margin, where it had been separated from the cornea. It had a dull, lustreless, grey color, and was lenticular in shape. The writer mentioned the great rarity of corneal tumors of any kind, and expressed his inability to account for the existence of the growth in his case. A model and microscopic sections and photographs were shown.

Optic Nerve Atrophy in Smokers.—Mr. Lawford read a paper based upon nine cases of optic nerve atrophy in which the symptoms in the early stage so closely resembled those of toxic amblyopia that the diagnosis made at first was that of tobacco blindness. All the patients were men and smokers, usually consuming a large quantity of tobacco. Treatment by abstinence from tobacco and the administration of nervine tonics led to no improvement; indeed, in most of the cases, sight became progressively worse. The general features presented by these cases were gradual failure of vision, with central negative scotomata for form and color. The ophthalmoscopic signs were slight pallor of the temporal half of the discs, without visible alteration in the retinal vessels. The chief dis-

tinction between these cases and those of ordinary tobacco amblyopia was found in the peripheral limitation of fields of vision, which was almost always discovered if sought for; whereas in tobacco cases the boundaries of the fields were in most, if not in all, instances normal. None of the patients under the writer's observation had symptoms of spinal disease, but one man, æt. 51 years, became insane some months after his sight failed. He was of opinion that tobacco was certainly a factor in the causation of the optic nerve disease.

Mr. Adams Frost said he was familiar with cases similar to those just described. He looked upon them as cases of tobacco neuritis in which secondary atrophy supervened. He had long been of opinion that if vision deteriorated beyond a certain point in tobacco amblyopia, recovery did not take place, and in such instances he was accustomed to give an unfavorable prognosis.

Mr. Edgar Browne (Liverpool) thought that the cases cited were undoubtedly instances of tobacco poisoning. They occurred in persons of unstable nervous constitution, not displayed otherwise than in the behavior of the optic nerves; the instance of three brothers quoted as being affected in a similar way bore out this impression. Many cases showing no contraction of fields recovered; on the other hand, those in which the disease was severe and of long standing, and in which the fields were limited, did not recover. He had recently under his own care two brothers, smokers, who both suffered from amblyopia; in one the disease progressed and the field of vision became contracted; in the other improvement occurred. He was not aware of any instances of similar optic nerve disease in non-smokers.

Dr. Hill Griffith said that he was familiar with cases like those described by Mr. Lawford. He did not look upon them as cases of tobacco neuritis, for he held that disease of optic nerves from tobacco was always followed by recovery on discontinuing the drug. He thought some such cases might be explained by the coincidence of progressive atrophy of optic nerves and tobacco amblyopia, as in one case he had in a patient with locomotor ataxy.

MR. DOYNE (Oxford) said that he had found that cases of tobacco amblyopia which were likely to improve always experienced great temporary improvement in sight from the inhalation of nitrite of amyl. He thought the use of strong tobacco interfered decidedly with nutrition and assimilation of food by its action upon the digestive tract. Many cases of tobacco amblyopia had loss of appetite.

DR. BRONNER (Bradford) spoke of the similarity in the effect of alcohol and tobacco on the optic nerves, and of the gaps which still existed in our knowledge concerning toxic amblyopia. He was accustomed to stop the use of tobacco in all cases of optic nerve atrophy.

MR. LAWFORD briefly replied.

The Artificial Maturation of Immature Senile Cataract by Trituration.—Mr. M. McHardy read this paper, in which he said that full five years' experience with the artificial ripening of immature senile cataracts, praticed with increasing frequency and confidence, had convinced him of the truth of the following proposition: Complete ripening of immature senile cataracts may be safely and almost certainly secured in from eight days to eight weeks by preliminary iridectomy, with trituration of the lens through the cornea and pupil, done with judgment, experience, and care; the ultimate results (surgical and visual) of extraction operations in such cases are quite equal to the results of similar operations for senile cataracts, which have been allowed to fully mature spontaneously; and, further, the removal of such artificially-matured cataracts is entirely free from those risks, drawbacks, and often impaired ultimate results, which follow from the removal of immature senile cataracts. He thought that a large debt was due to Fœrster for the iniation of this procedure. By memoranda from his first 25 and last 100 cases the author furnished details regarding his past experience with and present practice of the procedure, and emphasized thereby how its safety and success grew with the operator's experience.—*Brit. Med. Jour.*

SELECTIONS FROM AMERICAN MEDICAL JOURNALS.

A SIMPLE AND QUICK METHOD OF DETECTING ASTIGMATISM.[1]

BY F. C. HOTZ, M.D.,

Professor of Ophthalmology in Chicago Polyclinic; Attending Surgeon to Illinois Charitable Eye and Ear Infirmary, Chicago.

It is an old saying that "haste makes waste;" and every medical man will do well to have these three words inscribed in golden letters over his desk; for three-fourths of all the mistakes made in medical practice can be traced to hasty examination. But while we should spare no time in order to obtain a correct diagnosis, we do not like, on the other hand, to waste any time unnecessarily in the busy hours of the consulting room. While our examination should never be hurried, it often can be quick or slow, short or long, the time consumed being dependent a great deal on the method we employ; the one method may give us the desired information in five minutes, which we cannot get by another method in less than fifteen minutes.

In this respect the examination for astigmatism furnishes us a good illustration, and if we make quickness and precision the essential conditions for the best practical test for astigmatism, the methods at our disposal show a great difference in their practical utility.

[1] Read before the Section of Ophthalmology, at the Nashville meeting of the Am. Med. Association, May 20, 1890.

When we examine for astigmatism, we wish to find out first, of course, whether the eye is astigmatic; and if it is, we want to know the exact position of the two principal meridians. If this point is established with precision, it is an easy task to ascertain the refraction of either meridian, and thereby the degree of astigmatism, and to select the proper glasses.

Now, we can diagosticate astigmatism by the direct ophthalmoscopic examination, but you will admit this is not a quick and easy way. Much quicker and easier is the shadow test; but neither method can determine with precision the direction of the principal meridians.

We may often succeed in detecting astigmatism very quickly by rotating a cylinder glass before the eye, but just as often our patients' answers are so vague and misleading that a great deal of time is consumed before we are reasonably certain whether astigmatism exists, and where the meridians are located.

And as to the so-called astigmatic fan or clock and all its modifications, this test demands a degree of accurate observation the fewest of our patients possess. Especially with children (and they constitute no small proportion of our cases) this test is very tedious and unsatisfactory; but even grown persons seldom are quick in observing any marked difference in the lines unless their astigmatism is of a high degree. I have often tested patients upon this point, after their astigmatism had been established by other means, and the most of them could not see any difference in the lines until I pointed out those lines which, according to their astigmatism had to be the most distinct, and told them to compare them with those lines which had to be the least distinct; then, and not until then, they began to appreciate the differences. But in the examination, of course, it would never do to lead the patients in this way, because if you ask them whether they do not see certain lines more distinctly than others, nine out of ten will imagine to observe a difference which they do not see, and make you diagnosticate an astigmatism which does not exist.

Dr. Culbertson's prisoptometer is a very ingenious instru-

ment to detect anomalous refraction; but it, too, puts a greater demand upon the observing power than a great many patients can meet. I, at least, have found that it is impossible for many patients to appreciate slight variations in the contact of the two discs, so that they could tell with precision whether the contact remains exactly the same during the rotation, or at which angle of rotation it is disturbed the least and at which the most.

It would be tiresome to review all the methods and costly instruments which have been devised for the examination of astigmatism; they are no better than those I have mentioned. These, I believe, are the most popular methods, and I have shown that none of them fulfiils our conditions of quickness and precision in establishing the presence of astigmatism and the direction of the principal meridians; especially for the lower grades of astigmatism they are not very reliable.

Now. Mr. President, it has always seemed so strange to me, that we should waste our time with these elaborate methods when we have a much simpler and more sensitive test which will tell us quickly whether an eye is astigmatic, and at the same time, also, give us the correct position of the faulty meridians. This test is the retinal image of a distant point of light.

Since the rays coming from such a point, which pass through the meridian of greatest refraction, are focussed sooner than the rays which pass through the meridian of least refraction, the image upon the retina can never be a sharply defined luminous point. If the retina is at or near the anterior focal line, image will be elongated in the direction of the meridian of least refraction, and if the retina is at or near the posterior focal line, the image is drawn out in the direction corresponding with the meridian of the greatest refraction. Whenever, therefore, a patient sees a distant point of light elongated, we know he is astigmatic, and the line of elongation gives us, at once, the direction of the one, and indirectly, also, that of the other meridian, because they are always at a right angle to each other. And as it does not require a keen power of observa-

tion to tell the approximate shape of a small hole, this test is as quick as it is sensitive and precise; for it is very easy, even for a child, to determine whether the light looks round (like a pea or a marble) or oblong (like an egg, an almond, or half moon) or whether it has no definite form (like a star).

Theoretically, this distant point of light should appear elongated to every astigmatic eye, with the exception of such cases of mixed astigmatism where the myopia of the one meridian is about of the same degree as the hypermetropia of the other principal meridian; for, under these circumstances, the retina, being about in the centre of the focal interval, receives a round, though indistinct, dispersion image.

In persons over 40 or 45 years of age, you will find the results of the test agree with the theory. But among younger persons with active accommodation, you will find a great many who, though astigmatic, see the hole perfectly round, because their astigmatism is corrected by the unequal contraction of the ciliary mucle. I have found, however, that, if such patients look steadily at the light hole, they will observe its form is constantly changing from round to oval,and back to round again. This observation shows how sensitive this test is, and at the same time furnishes us an interesting evidence of the unequal contraction of the ciliary muscle.

But, fortunately, we have in mydriatics the effectual means of eliminating the disturbing influence of the ciliary muscle; and I never consider the examination for astigmatism in a young person completed unless the accommodation has been suspended. When this is done, the light hole will always appear elongated in simple astigmatism, and in all cases of compound astigmatism, provided the refraction of one meridian dose not depart from emmetropia by more than $^1/_2$ or 1 dioptry. With higher degrees of ametropia in both meridians, the retinal image is so blurred that the patient cannot make out any definite shape; but the proper spherical glass (+ or —, as the case may be) which corrects the ametropia of one meridian, and thus reduces the compound to a simple astigmatism, will produce a better defined image, and reveal at once the elonga-

tion of the point. And in the same way we can reduce mixed astigmatism to the simple kind, and obtain the distinct oval image by our test.

Sometimes a patient will see the hole double, instead of

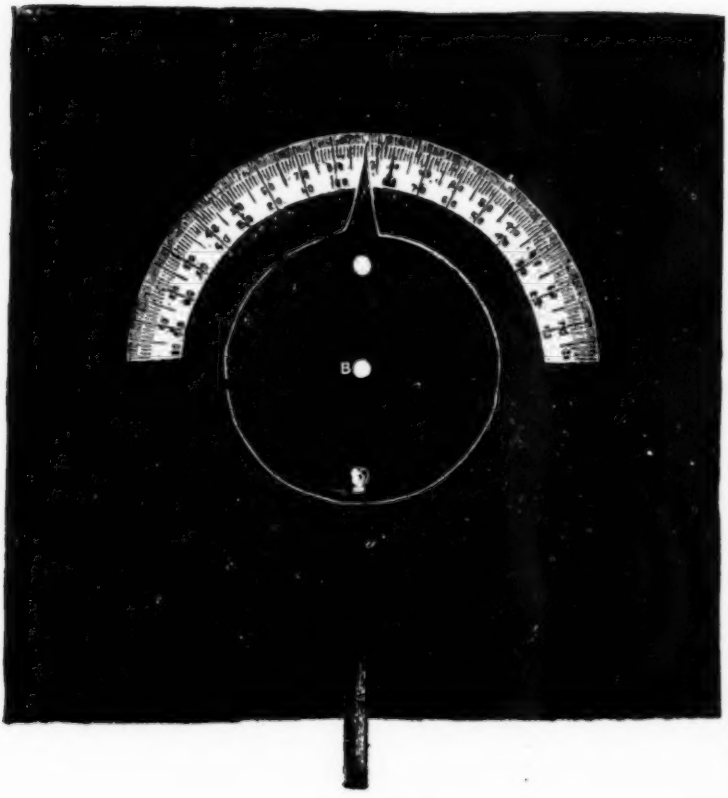

FIG. 14.

oblong; in this case, the position of the secondary hole, above or to the side of the other, defines the directions of the meridian just as well as the vertical or horizontal elongation does.

I began using this test in 1872, when I had a little instrument made for this purpose, which, in want of a better name,

I baptized "astigmometer," although I employ it more for *detecting* than for *measuring* astigmatism; but you can measure its degree with it just as well.

Description of the Astigmometer.[1]

The instrument, which I take pleasure in showing you now, consists of a blackened metal screen 20 centimeters (8 inches) square; in its center it has a round aperture (B); and the semicircle of a protractor is fastened to it, so that the 90 degree mark is exactly perpendicular over the round hole, and the 180 degree mark exactly on a horizontal line with it. Between the protractor and the central hole, a semicircular slot, 10 millimetres wide, is cut into the screen, but is covered in front by a round metal disc, which can be rotated round the central opening, and which has, near its periphery, a round hole (A), so arranged that it travels exactly along the slot when the disc is rotated. Just over this second hole (A), the edge of the disc is drawn out to an arrow-like point, which reaches the concave margin of the protractor. This point and the centers of the two holes are exactly in a straight line; and, therefore, the angular degree of the protractor to which the arrow points will always show the radius in which the movable hole (A) is situated. Both holes are exactly of the same size; on the front side they have a diameter of 4 millimeters, but on the other side they are much larger. This was done to make sure that no shadows could interfere with our observations; for the metal around the holes (especially around the central one) is so thick that, if they had the same size on the posterior as on the anterior face, the posterior edge might cast a shadow when the hole is illuminated from behind, and this shadow might make the hole appear to the spectator in a different than its true from though he be not astigmatic. Finally, in order to avoid any glaring light, and to make the outlines sharp and distinct, the holes are filled with small bits of ground glass, so that they light up with a uniform mellow light. Diametri-

[1] For sale by Sharp & Smith, 73 Randolph Street, Chicago.

cally opposite the arrow, there is a small knob, by which the disc can be conveniently rotated if necessary.

How to use the astigmometer: The instrument may be set in a window shutter, or placed in front of a gas or lamp-light. My instrument is set into a movable bracket, which is fastened to the wall, and thus it is out of the way. When I wish to use it, I swing the bracket so that the screen stands exactly perpendicularly, and about 6 or 8 inches in front of the gas-light, which stands just a little higher then the central hole. The screen is so high from the floor that the holes are about on a level with the eyes of a patient, sitting (if an adult) or standing (if a child) 15 feet away. Especial care must be taken that the plane of the screen is exactly at right angles to the visual line of the patient. The room is then darkened, the gas-light turned on just enough to light up the holes, and the patient is directed to look at them, with one eye at a time, and to tell whether he sees them distinctly enough to make out their form. Never ask a leading question like this: "Do you see those round holes?" because the *Suggestion* of the round form inplied in the question will make the patient see the holes round, even though they actually appear to him oblong. Let the patient describe what he sees, and you will easily and quickly find out whether the holes appear indistinct, or round, or oblong.

The great advantage of this instrument is, that as soon as, with or without spherical glasses, the holes appear drawn out, we do not only know the eye is astigmatic, but we know also at once the exact direction of the faulty meridians. If the patient declares the elongation is straight up or straight across, we know, of course, the two meridians are vertical and horizontal. Bnt if the elongation occurs in an oblique direction, the patient can seldom estimate accurately the angle of inclination; and just here this apparatus is of the greatest value, for it will determine the inclination quickly and precisely. While the patient is looking at the holes, we only have to turn the round disc to the right or left until the peripheric hole (A) is moved to a point where its long axis (as seen by the patient)

makes one straight line with the long axis of the stationary central hole. The degree to which the arrow then points gives the exact angle of inclination of the meridian. For instance, if the patient sees the holes drawn out obliquely up to the right, I must move the peripheric hole, if it stands at 90°, down to the right, to bring it into the line of inclination. Before doing this, I explain to the patient, by means of two pencils, what I wish to accomplish, and what I mean by "bringing the two ovals into the same line;" when he understands it, and I begin rotating the disc, he is to tell me to stop when the holes are in line. This done, I look at the indicator, it points to 45°, and I know at once the one meridian is inclined 45°, and the other, of course, 135°.

Dr. S. M. Burnett, who, as far as I know, is the first author since Donders giving a description of this test, says:[1] "But while this gives us the direction of the principal meridians, it furnishes no information as to the form of the astigmatism, the light spot being drawn out in the same direction in M and H." This is true, but if you wish to get this information, you can quickly have it by a few trials with spherical glasses. Suppose, for instance, the light holes appear elongated vertically, and a+1D makes them still longer, but at the same time broader and less distinct, while a—1D reverses the elongation and draws the holes out horizontally, you know at once there is myopic astigmatism in the vertical meridian, and if you like, you can determine even the exact degree of the M by that grass, which changes the light spots to a horizontal line.

Whether you like to determine the refraction of the meridians in this way first, and then to find out the visual acuteness by means of glasses and the testtypes, or whether you prefer to determine the refraction and vision in each meridian at one and the same time, with the aid of the stenopaic slit—that is, perhaps, a matter of personal choice. I, for my part, use the stenopaic slit and test-types as soon as the astigmometer has furnished the direction of the meridians; for in this way I can

[1]Treatise on Astigmatism, p. 76.

find out the quickest which glasses will give the patient the best possible eyesight.

And this is the practical and final problem our examination for astigmatism has to solve, and which it can solve only by means of the test-types and lenses. All the other methods are useful only in preparing the way for this final test. And among these preliminrry tests I regard the distant point of light as the most useful one. It is probably the oldest test for astigmatism; for Prof. Donders, as we all know, has used it extensively in his classical investigations on astigmatism. In 1873 Dr. W. L. Purves spoke of its merits in *Graefe's Archiv* (XIX) and described an instrument very similar to the one which I had made for my own use a year previously. But as I have not seen it used by any one else, and having tested its reliability and practical value these eighteen years, I cannot longer resist the desire to see it more generally employed. And I feel convinced you will find it, as I did, a most useful addition to your office outfit, and a time saving instrument in your practical work.--*The Times & Register.*

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